



USER MANUAL

CSD300(/R)

001-1032
AIS Colour Display

003-1032-MA-v01r01
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CONTENTS

1	INTRODUCTION	4
1.1	How AIS Works.....	4
1.2	AIS Classes	4
2	INFORMATION TRANSMITTED AND RECEIVED.....	5
2.1	Class A Units	5
2.2	Class B Units	5
3	CONTENTS OF THE BOX	6
4	CSD300 INSTALLATION	6
4.1	Mounting.....	6
4.2	Power / Data Connections	7
4.3	Setup NMEA GPS Port.....	8
5	GETTING STARTED.....	9
5.1	C-Map Charts	9
5.2	Keys.....	10
5.3	Switching On.....	10
5.4	Brightness Control	10
5.5	Main Display	11
5.6	Operation.....	12
6	AIS MENU	13
6.1	AIS SART Messages	15
7	MAIN MENU	16
7.1	Chart Features.....	16
7.2	GPS Setup.....	16
7.3	Setup	17
7.4	Maintenance	17
7.5	Chart Orientation	17
7.6	Display Setup.....	17
8	TROUBLESHOOTING GUIDE	18
9	NMEA 0183 MESSAGES	19
10	SPECIFICATION.....	20
11	GENERAL WARNINGS.....	21
12	DECLARATION OF CONFORMITY	21
13	LIMITED WARRANTY	22
14	PRODUCT SUPPORT	22

1 INTRODUCTION

1.1 How AIS Works

The marine Automatic Identification System (AIS) is a location and vessel information reporting system. It allows vessels equipped with AIS to automatically and dynamically share and regularly update their Position, Speed, Course and other information such as Vessel Identity with similarly equipped craft. Position is derived from a Global Navigation Satellite System (GNSS) network and communication between vessels is by Very High Frequency (VHF) digital transmissions. A sophisticated and automatic method of time sharing the radio channel is used to ensure that even when a large number of vessels are in one location, blocking of individual transmissions is minimised.

1.2 AIS Classes

There are two classes of AIS unit fitted to vessels, Class A and Class B. In addition AIS base stations may be employed by the Coastguard, port authorities and other authorised bodies. AIS units acting as aids to navigation (AtoNs) can also be fitted to fixed and floating navigation markers such as channel markers and buoys. AIS SARTs are now available which transmit a position and alert in the event of a man overboard or distress situation.

Class A units are a mandatory fit under the Safety of Life at Sea (SOLAS) convention to vessels above 300 gross tons or which carry more than 11 passengers in International waters. Many other commercial vessels and some leisure craft also fit Class A units.

Class B units are currently not a mandatory fit, but authorities in several parts of the world are considering this. Class B units are designed for fitting to vessels which do not fall into the mandatory Class A fit category.

2 INFORMATION TRANSMITTED AND RECEIVED

2.1 Class A Units

A Class A unit will transmit its IMO number, MMSI, Call Sign and Name, Length and Beam, Ship Type, Time, Course Over Ground (COG), Speed Over Ground (SOG), Heading, Navigational Status, Rate of Turn, Draught, Cargo Type, Destination and Safety related messages, via a short message service (SMS) facility. Message lengths are variable with static and voyage related information being transmitted less often.

Class “A” Shipborne Mobile Equipment Reporting Intervals:

Ship's Dynamic Conditions	Reporting Interval
Ship at anchor or moored	3 Minutes
Ship at anchor or moored and moving faster than 3 knots	10 Seconds
Ship 0-14 knots	10 Seconds
Ship 0-14 knots and changing course	3 1/3 Seconds
Ship 14-23 knots	6 Seconds
Ship 14-23 knots and changing course	2 Seconds
Ship >23 knots	2 Seconds
Ship >23 knots and changing course	2 Seconds
Ships Static Information	6 Minutes

2.2 Class B Units

A Class B unit will transmit its MMSI, Call Sign and Name, Length and Beam, Ship Type, Time, Course Over Ground (COG), Speed Over Ground (SOG) at intervals as below:

Ship's Dynamic Conditions	Rate
Ship with Speed Over Ground < 2 Knots	3 Minutes
Ship with Speed Over Ground > 2 Knots	30 Seconds
Ships Static Information	6 Minutes

NOT ALL SHIPS CARRY AIS, the navigator should be aware that other ships and, in particular, leisure craft, fishing vessels and warships may not be fitted with AIS. AIS equipment fitted on other ships as a mandatory carriage requirement may also be off based on the Masters professional judgement.

CSD300(/R)

3 CONTENTS OF THE BOX

Before proceeding with the installation of the CSD300, check the contents of the box which should include:

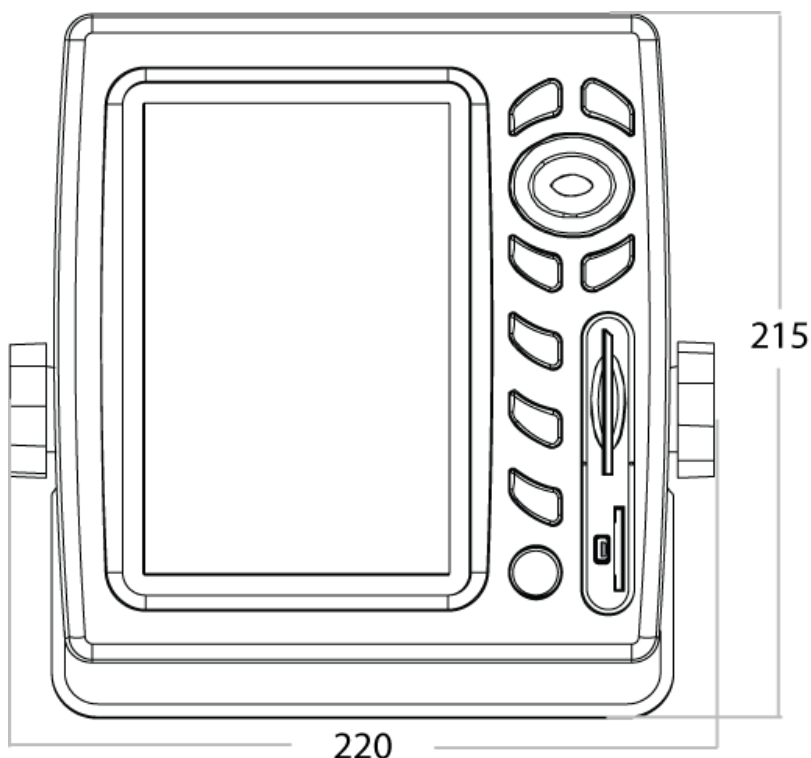
- The CSD300 Display Unit
- CSD300 Screen Protector
- Trunnion Mounting Bracket
- Trunnion Knobs
- Power Cable
- This Manual

4 CSD300 INSTALLATION

4.1 Mounting

The CSD300 should be mounted in a location that is protected from direct water and spray, and not in direct sunlight in an enclosed area where it could be subjected to extreme heat. The display protective cover should be fitted when not in use.

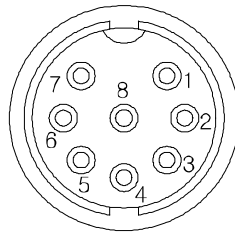
Allow clearance at the back of the unit for the Power/Data cable to be connected.



Select the best location to mount the unit, remove the unit from the mounting bracket and fix the bracket to a secure location either with the screws supplied or suitable alternatives.

4.2 Power / Data Connections

Pin	Wire colour	Function
1	Black	Power Negative
2	Red	Power Positive (10-40V DC)
3	White	GPS Input + (4800 Baud)
4	Green	GPS Input - (4800 Baud)
5	Grey	N/C
6	Yellow	N/C
7	Brown	External NMEA AIS Input +
8	Blue	



Electrical Connections

Connect a 12/24V DC supply (10-40V) capable of supplying 1Amp peak to the DC power lead.

Positive = RED Negative = BLACK



WARNING: DO NOT connect the CSD300 Display unit to a mains (line) AC electrical supply, as an electric shock or fire hazard could result.

CSD300(/R)

AIS / GPS Connections

The CSD300 requires connection either to an external AIS Receiver and an external NMEA GPS / Chart Plotter or to an external Class A or Class B Transponder. The unit has no internal GPS, so requires a NMEA connection from an existing GPS / Chart Plotter to show current position, however it will obtain its position from the internal GPS of a Class A or B Transponder if it is being sent on the NMEA output.

The CSD300 has its own built in AIS Receiver so only needs a NMEA connection to an existing GPS or Chart Plotter.

Connections to an AIS Receiver or Transponder at 38,400 baud:

CSD300	AIS Receiver/Transponder
Pin 7 Brown (AIS Input +)	NMEA Output +
Pin 1 Black (Negative)	NMEA Output -

Connections to an External GPS/Chart Plotter at 4800 baud:

CSD300	External GPS/Chart Plotter
Pin 3 White (GPS Input +)	NMEA Output +
Pin 4 Green (GPS Input -)	NMEA Output -

Connections from the CSD300 to the CSB200 Class B:

CSD300	CSB200 Class B
Pin 7 Brown (AIS Input +)	Yellow(NMEA Output +)
Pin 1 Black (Negative)	Brown(NMEA Output -)

4.3 Setup NMEA GPS Port

To select the port on which the GPS data is connected press the **MENU** key, scroll down the list with the **▼** key until “2.GPS Setup” is highlighted in blue.

Press the **ENTER** key to display the GPS Setup menu, scroll down with the **▼** until “4. GPS Receiving Port” is highlighted in blue.

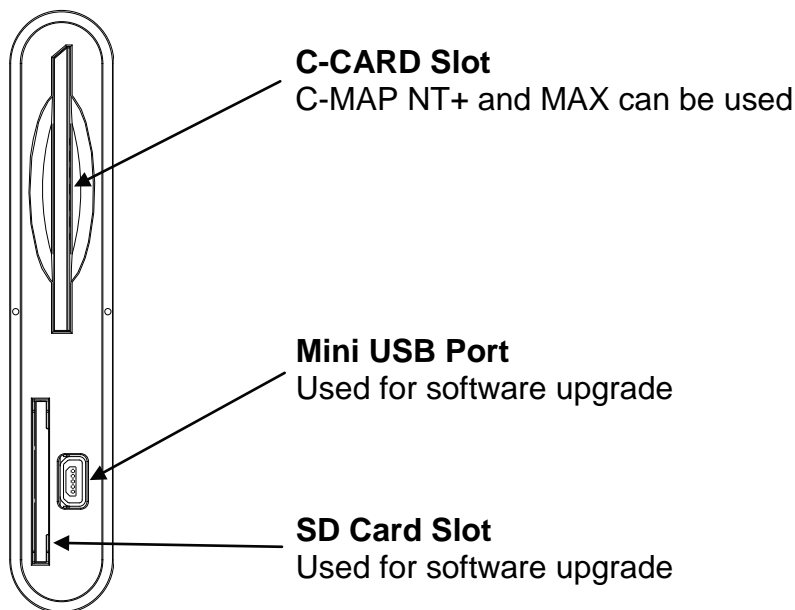
The default setting is “Combined” which means it expects AIS and GPS data to arrive together on the AIS connections, if you have GPS data connected to a separate GPS/Chart Plotter at 4800 then you need to press the **►** which will highlight the “Separate” in red, repeated pressings of the **CLEAR** key will return the display to the main screen.

5 GETTING STARTED

5.1 C-Map Charts

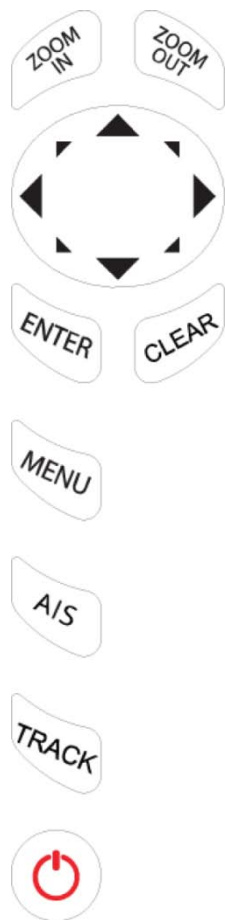
The unit is supplied with a basic Worldwide background chart, if you require more local detail you can purchase C-MAP NT+ or MAX charts in standard C-Card format.


To install the chart cartridge remove the protective rubber cover on the front and insert the card into the slot.



CSD300(/R)

5.2 Keys




[ZOOM IN]	Changes to a larger chart scale
[ZOOM OUT]	Changes to a smaller chart scale
[ARROW KEYS]	Moving the cursor, scrolling and setting the menu
[ENTER]	Press to enter menus
[CLEAR]	Returns to previous pages
[MENU]	Selects Setup menus
[AIS]	Selects AIS menus
[TRACK]	Start and Stop AIS tracks
	PWR: Turns the unit On/Off BRT: Adjusts the brightness in day or night mode





5.3 Switching On

To switch the unit ON press and hold the Power button  down until the blue COMAR Systems start up screen appears.

Once the unit has initialized it will display the C-Map “Caution” warning screen. Press the **[ENTER]** button to continue.

To switch the unit OFF, press and hold the Power button , it will switch off if you keep the button pressed for at least 3 seconds. If you release the button before the count down timer has finished the unit will remain on.

5.4 Brightness Control

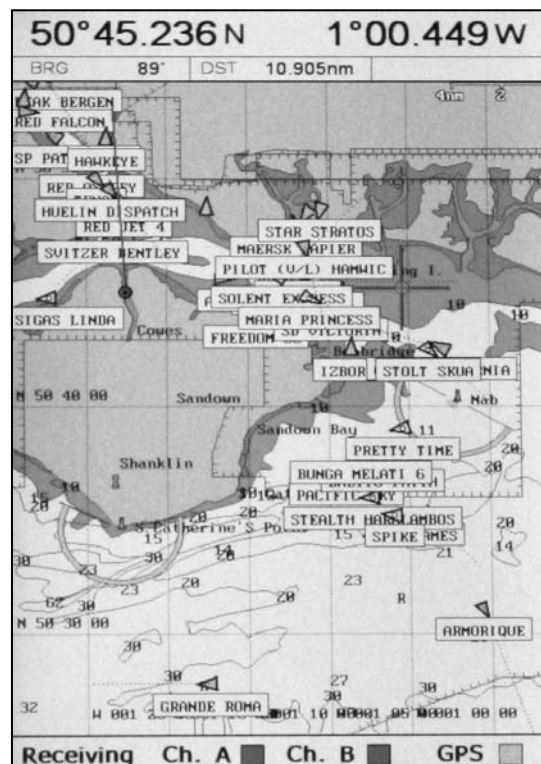
To adjust the brightness of the display momentarily press the Power button, the brightness can be varied by pressing the  or  arrow keys. Different colour palettes for the chart can be selected by pressing the  or  arrow keys.

5.5 Main Display

The chart will initially be centred on the default position in the UK, once the external GPS has acquired lock the screen will automatically be centred on your boats current position. On future switch ons, it will centre its position where it was last switched off. At the bottom of the screen is the receiving status bar, if you are receiving data from other AIS vessels the Ch A and Ch B indicators will randomly flash green. The GPS indicator will illuminate to indicate correct connection to the external GPS source. Pressing the **ZOOM IN** or **ZOOM OUT** keys will increase or decrease the chart scale.

You can move the cursor away from your current own boats position by using the **▲** **▼** or **◀** **▶** keys, the cursors Lat and Long will be displayed at the top of the screen, along with the range and bearing from your current position. To return the cursor to your current position, press the **CLEAR** key.

AIS Vessels will appear on the screen as green diamonds with the vessels MMSI alongside it. After a short period the vessels names will also be displayed, this data is transmitted less frequently than position data, so will take time before being displayed.



CSD300(/R)

5.6 Operation

Pressing the **MENU** key will bring up the following main menu screen:

MAIN MENU	
1. Chart Features	
2. GPS Setup	
3. Setup	
4. Maintenance	
5. Chart Orientation	
6. Display Setup	

Pressing the **▲** or **▼** arrow keys will scroll through the menu headings, once you have highlighted the one you want pressing the **ENTER** key will take you into that detailed menu.

Eg: If you selected 1. Chart Features then press the **ENTER** key, the following options are available:

Font & Symbols: Normal Large

Alternate pressing of the **◀** or **▶** arrow keys will select Normal or Large Fonts, leave it on the selection highlighted in Red of your choice.

Pressing the **CLEAR** key will save your selection and return you to the previous page.

You can scroll up and down the menu as previously. To switch a value ON or OFF the **▶** arrow key will turn it ON, and the **◀** arrow key will turn it OFF. To return to the previous menu or page press the **CLEAR** key.

6 AIS MENU

To obtain more information on AIS vessels or to configure the AIS features press the **AIS** key.

List of Vessels

Pressing the ENTER key will display a list of current AIS vessels in view. Initially these are sorted by showing the nearest first, additional pages of vessels can be displayed by pressing the **▶** arrow key. The vessels Name, MMSI, Range and Bearing are shown.

To sort alphabetically by Name press the **ZOOM IN** button, alternate pressing of this button will toggle between A to Z and Z to A order.

To sort numerically by MMSI press the **ZOOM OUT** button, alternate pressing of this button will toggle between 0-9 and 9-0 order.

To sort by Range press the **MENU** button, alternate pressing of this button will toggle between nearest and furthest.



Pressing the **▲** or **▼** arrow keys will move the highlight blue bar over different vessels. Pressing **ENTER** when a vessel is highlighted will display another page showing all the details so far received from this vessel. Details of other vessels in the list can be accessed directly by scrolling through with the **◀** and **▶** arrow keys. To return to the main list press the **CLEAR** button.

To goto a vessels position directly, scroll through the list to highlight the vessel you wish to go to and press the **AIS** key. The screen will now return to the main chart display and be centred on the vessel you have selected.



The display also has the ability to TRACK up to 5 different vessels at any one time, this feature can be enabled by either selecting a vessel in the list or directly from the **TRACK** key. Select a vessel from the list and press the **TRACK** key, the selected vessel will now move to the top of the list and be highlighted with a yellow background. Pressing the **CLEAR** key twice will return the display to the main chart view and the vessel selected to be tracked will be highlighted in yellow. (All the time this vessel is selected for tracking it will leave a yellow track of its past history of positions). Placing the cursor over the vessel that is being tracked and pressing the **ENTER** key will display an additional window in the lower half of the screen showing more details of the vessel. To deselect a vessel being tracked place the cursor over the vessel and press the **TRACK** key, the vessel will now revert to its normal colour, and move back down the AIS List to its original location.

Alternatively you can track a vessel directly from the main chart screen by placing the cursor over the vessel and pressing the **TRACK** key, and if you require more detail pressing the **ENTER** key.



Display Vessels by Colour

You can choose to display certain types of vessels by different colours to help in quickly identifying what type of vessels are showing on the chart. Scroll down the list until the vessel type you want to alter is highlighted in blue, pressing the  arrow key will scroll you through the choice of colours, press the  arrow key to go backwards, leave the colour selection of your choice showing and press the **CLEAR** key to exit.











Display Vessels by Type

Different types of AIS transmissions can be selected to display different types of icons on the chart display. Scroll down the list until the type of AIS transmission you want to alter is highlighted in blue, pressing the  arrow key will scroll you through the choice of icons, press the  arrow key to go backwards, leave your choice of icon showing and press the **CLEAR** key to exit.








Filter AIS Types

This function allows you to turn on or off reception from different types of AIS transmissions, for instance, if you only wanted to view Class B vessels on the chart display then select Class B On and all the others Off. Scroll down the list until the type of AIS transmission you want to switch on or off is highlighted in blue, pressing the  arrow key will turn the type OFF, pressing the  arrow key will turn the type ON, leave your choice in the status you require and press the **CLEAR** key to exit. If you do not want to show vessels that are stationary, then select the option of vessels speed less than 0.2Kts to OFF.



Set up Alarm

The two alarm parameters can be changed to suit your particular circumstances. The CPA alarm is the closest approach alarm, this allows you to set a distance when the alarm will sound if a vessel comes within that distance. The alarm can be turned ON or OFF by use of the  or  keys. The range at which you want the alarm to sound can be adjusted by selecting CPA limit, pressing the  key will increase the range, and pressing the  key will decrease the range, pressing **CLEAR** will exit the function. A red range ring will be drawn on the chart screen centred on your own vessels position at the distance you have specified. The TCPA alarm is the time that a vessel will take to be in the same position as you currently are, this alarm can be turned ON or OFF by use of the  or  keys. The time at which you want the alarm to sound can be adjusted by selecting TCPA limit, pressing the  key will increase the time, and pressing the  key will decrease the time, pressing **CLEAR** will exit the function. If you want the alarms to ignore vessels that are travelling at less than a particular speed then switch the "Ignore vessels if speed less than" function ON, and adjust the speed control by use of the   keys to the desired value.



Set up AIS time outs etc.

This menu controls certain specific AIS functions. If repeat transmissions are not received from a vessel after 7 minutes then the target is marked with a X. This time can be altered by using the   keys. If repeat transmissions are not received from a vessel after 10 minutes then the target is removed from the chart display. This time can be altered by using the   keys. The AIS Status Bar shown at the bottom of the screen giving the reception of Channels A and B on the AIS frequency, and the GPS reception can be removed by selecting NONE with the  key. It is possible to switch ON and OFF some AIS transponders transmitters connected to the display with the Transmitter function, pressing the  key will turn the transmitter off, pressing the  key will turn the transmitter On. Note this function is only valid for the CSB200 Transponder.





Labels on Vessels

This menu controls what details are displayed alongside the vessels icons on the chart display, the default is the MMSI number and Name of vessel. You can scroll up and down the list and turn ON or OFF what details you would like to be displayed alongside each vessel by use of the   keys.

Cursor Box Info

When you move the cursor in chart mode over an AIS target, a box appears showing details of that vessel. You can configure that box to show various details by turning ON or OFF the features in the menu with the   keys.

Messages Received

This window displays lists of specific AIS messages, such as Safety Messages that the unit has received. Scrolling down the list and highlighting a message allows you to see the contents by pressing the  key. Whilst in the main list pressing the  key when a message is highlighted will erase that message, pressing the   keys will allow you to view any other pages of messages.

6.1 AIS SART Messages

If an AIS SART message is received it will immediately be displayed on whatever screen you are viewing. If the "Status" shows "Test" then no further action is required as it is just a test transmission. If the "Status" shows "Active" it will also show the MMSI, Name and position, the SART icon should now be displayed on your chart screen at that location. Monitor your VHF radio on Channel 16 and establish whether any other station has received this SART message, if not take the appropriate action.

7 MAIN MENU

The main **MENU** key allows you to configure the display and chart features:

7.1 Chart Features

Font and Symbols:	Normal size is the default, you can select large if required
Mixing Levels:	When the chart coverage at the current zoom level does not fill the screen, the unit draws the rest from other zoom levels
Perspective View:	Selecting ON will change the chart view to perspective
Dynamic Nav-Aids:	Selecting ON will cause the Nav-Aid light in range to blink
Chart Boundaries:	Auto is the default, you can also select ON or OFF
Tides & Currents:	Tidal current vectors can be displayed on the chart
Depth:	More detailed spot depths can be shown
Anchor Prohibition:	Prohibited anchorage areas can be shown on the chart
Place Name:	Names of Towns and Cities can be shown
Bottom Symbols:	The type of seabed can be shown on the chart

7.2 GPS Setup

Datum:	Fixed at WGS-84, standard for AIS positions
Average Speed:	Will show your SOG as an average over the selected period in seconds
Lat/Lon:	Display your position to 3 or 4 decimal places
GPS Receiving Port:	Select "Combined" if using an external transponder or receiver with GPS data, or "Separate" if connected to a independent GPS receiver at 4800 Baud
Satellite Status Page:	Views the status of the satellites currently being received, all the information may not be displayed depending on the NMEA GPS output messages from the Transponder/GPS unit

7.3 Setup

Vessel offset:	Places the position of your vessel either at the centre of the screen or 1/3 or 2/3 offset from your present heading
Present Position Size:	Alters the size of the icon of your own vessel
Heading Line Length:	Varies the length of your own vessels heading line
True/Magnetic:	Options of having True, Magnetic or Auto
Compass Correction:	Possible to allow for compass correction
Time Offset:	Default GMT, you can apply local time
Reset:	Will reset the unit to the factory default settings
Dist/Speed Unit:	Select your preference
Depth Unit:	Select your preference, default Meters
Sound:	Turn the beeper on or off

7.4 Maintenance

System information:	Displays current software version
Chart Information:	Displays current C-Map cartridge installed
Language:	Choose the language you require, default is English
Simulator:	Selecting On will place the unit in demonstration mode

7.5 Chart Orientation

True Motion:	Sets the chart orientation to true motion
North Up:	Sets the chart orientation to north up
Head Up:	Sets the chart orientation to head up

7.6 Display Setup

Full Screen:	Default, maximum area for chart
Chart + Pos:	Will display the chart plus current position at the bottom of the screen
Chart + Pos Large:	Larger fonts with current position
Range Rings:	Displays range rings centred on your current position
Chart Display:	Removes background chart from display completely

8 TROUBLESHOOTING GUIDE

No AIS Data Displayed

- If connected to an external AIS receiver/transponder check the NMEA connections
- Check the NMEA output from the AIS Receiver/Transponder is set at 38,400 Baud
- Check the AIS receiver/transponder is actually receiving data from vessels

No GPS Position

- Check you have selected the correct source of the GPS input in MENU/GPS SETUP/4 GPS Receiving Port. Choose “Combined” if with AIS data, or “Separate” if from an external GPS/Chart Plotter
- Verify the external GPS unit is working
- Check the GPS NMEA output from the external GPS/Chart Plotter is set at 4800 Baud

No Names on Vessels

- Names as well as other static data is only sent every 6 minutes so this will take time to appear alongside the vessels icons

9 NMEA 0183 MESSAGES

The CSD300 accepts AIS data at 38,400 Baud in the VDM format:

VDM Message Format

!--VDM, x1,x2,x3,a,s--s,x*hh<CR><LF>

- x1 = Total number of sentences needed to transfer the message, 1 to 9
- x2 = Sentence number, 1 to 9
- x3 = Sequential message identifier, 0 to 9
- a = AIS Channel, "A" or "B"
- s - - s = Encapsulated ITU-R M.1371 radio message
- x = Number of fill-bits, 0 to 5

The CSD300 will accept GPS from either a GGA or RMC NMEA message. If combined with the AIS data it will be at 38,400 Baud, if input to the CSD300 on Port 2 from a separate GPS source it should be at 4800 Baud.

GGA Message Format

\$GPGGA,hhmmss.ss,A,IIII.IIII,a,yyyyy.yyyyy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>

- hhmmss.ss = UTC of Position Fix
- IIII.IIII,a = Latitude, N/S
- yyyyy.yyyyy,a = Longitude, E/W
- x = GPS quality indicator
- xx = Number of Satellites in use
- x.x = HDOP
- x.x,M = Altitude in meters
- x.x,M = Geoidal Separation in meters
- x.x = Age of Differential Data
- xxxx = Differential Station ID

RMC Message Format

\$GPRMC,hhmmss.ss,A,IIII.IIII,a,yyyyy.yyyyy,a,x.x,x.x,xxxxxx,x.x,a,a*hh<CR><LF>

- hhmmss.ss = UTC of Position Fix
- A = Data Valid V = Navigation Receiver Warning
- IIII.IIII,a = Latitude, N/S
- yyyyy.yyyyy,a = Longitude, E/W
- x.x = Speed Over Ground, Knots
- x.x = Course Over Ground, Degrees True
- xxxxxx = Date, ddmmyy
- x.x,a = Magnetic Variation, Degrees E/W
- a = Mode Indicator

CSD300(/R)

10 SPECIFICATION

Physical	
Dimensions:	H198 x W185 x D60mm
Weight:	1Kg
Operating Temperature:	-25°C to +55°C
Power	
Power Supply Range:	10 - 40 Volts DC
Power Consumption:	1 Amp
Electrical Interfaces	
Port 1:	NMEA 38.4k Baud (AIS/GPS)
Port 2:	NMEA 4800 Baud (GPS)
Connectors	
Power/Data:	8-pin
VHF Antenna Connector:	CSD300/R Model only

11 GENERAL WARNINGS

All marine Automatic Identification System (AIS) units utilise a satellite based system such as the Global Positioning Satellite (GPS) network or the Global Navigation Satellite System (GLONASS) network to determine position. The accuracy of these networks is variable and may be affected by factors such as the antenna positioning, how many satellites are used to determine a position and how long satellite information has been received for. It is desirable wherever possible therefore to verify both your vessels AIS derived position data and other vessels AIS derived position data with visual or radar based observations.

12 DECLARATION OF CONFORMITY

Hereby, Comar Systems Ltd of Vittlefields Technology Centre, Forest Road, Newport, Isle of Wight, PO30 4LY, United Kingdom, declare that this CSD300 is in compliance with the essential requirements and other relevant provisions under CE standards:

Safety: EN 60950-1: + A11:
EMC: EN 301 489-1 V1.8.1: EM 301 489-3 V1.4.1
EN 55022: + A1: EN 55024: + A1: +A2:
EN 6100-3-2: EN 610003-3: + A1: + A2:
EN 61000-6-3: + A11:, EN 61000-6-1
Radio: EN 300 440-2 V1.4.1

13 LIMITED WARRANTY

Comar Systems Ltd warrants this product to be free from defects in materials and manufacture for one year from the date of purchase. Comar Systems Ltd will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labour. The customer is, however, responsible for any transportation costs incurred in returning the unit to Comar Systems Ltd.

This warranty does not cover failures due to abuse, misuse, accident or unauthorised alteration or repairs.

The above does not effect the statutory rights of the consumer.

Note: Every effort has been made to ensure that all information contained in this manual is accurate at the time of going to press. We therefore cannot take any responsibility for the content of this manual and advise that you take normal steps to ensure that the information is at its most current when you are reading this manual.

14 PRODUCT SUPPORT

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